POSTAL SERVICE PROGRESS

An Insight Into the Workings of an Important Establishment.

How the Mails Are Hurried From Sender to Destination Over Land and Sea—Hazardous Transfers at the Mouth of the Detroit River.

When Timothy Pickering served as Postmaster General in Washington's Administration his balance sheet of expenditures and receipts for a whole quarter of a year showed an aggregate of $63,000. This amount is now expended by the Postoffice Department every six hours. So great has been the increase of the postal system of this country of late years that in 1880 the revenues and expenses were just about one-third what they are this year.

"The great development of the postal service," said a prominent official of the department, "has come within a single generation. Thirty-six years ago there was no free delivery; now one-third of the people of the United States have their mail brought directly to their doors. A generation ago there was no distribution upon the rail. Every piece of mail, instead of going directly from the sender to the receiver, went to a central distributing office to be redistributed and recarried. In those days there was no uniform foreign postage, and every time a foreign letter was mailed the sender had to study a guide to find out what the postage was. There were no fast mails, no letter-carriers, no railway mail force, no special deliveries, and no money-order system, which now transacts such an immense business. The great improvements which have made the service what it is, and which excite the wonder and admiration of all who grasp its details, have come within comparatively few years, and no development of our modern economic forces is more remarkable than the evolution of the splendid machinery which now maintains the intercourse of civilized society."

The Postoffice Department is divided into four great bureaus, each being under the immediate charge of an Assistant Postmaster General. The general scope of each may be stated without being too precise, or entering into an amount of detail foreign from the purpose of a popular descriptive article. The First Assistant's bureau deals with the practical administration of the postoffices, with their great clerical and carrier forces and with all the many questions of actual management. It supervises an annual expenditure of more than $40,000,000. The bureau of the Second Assistant has the immense task of providing for the transportation of the mails. The yearly cost is over $35,000,000. That of the Third Assistant looks after the financial side, furnishes the stamps and keeps the accounts. The Fourth Assistant has charge of the appointment of over 70,000 postmasters, and directs the force of inspectors. Besides these principal divisions of the Postoffice Department, there is the Auditor's office, with its 500 clerks, which is a bureau of the Treasury, and through which all postoffice accounts must pass for scrutiny and audit.

The postoffices are of every rank, from that of New York, with its revenue of more than $8,000,000, and its net profit of more than $5,000,000, to the little cross-roads office, the receipts of which do not exceed $25. What are called Presidential offices are those where the annual salary of the postmaster is not less than $1,000, and in these cases the President makes the appointment. The number of such offices is nearly 4,000. The fourth-class offices, with salaries of less than $1,000, where the appointment is normally made by the Postmaster General, number about 70,000, and this figure sufficiently explains why it is impossible for any central authority to make the examinations necessary for selection, and why the practical choice must be left to local representatives, or an entirely different system adopted.

The delivery of the mails is the popular and visible result of the postal system. The delivery system has been carried to a high degree of perfection. The city residents, who accept as a matter of course the visits of the grey-coated or shirt waisted messengers of the postoffice, from three to eight times a day, find it difficult to recall that prior to 1863 the letter carrier service had no existence in the United States. Now it is represented by a compact army of more than 14,000 men, with a payroll exceeding $14,000,000 a year.

In a number of features the postal service is not devoid of personal danger to the employes, as for instance the marine service on the Great Lakes. At the mouth of the Detroit River, during the open season of eight months, a steamship passes every three and one-half minutes, day and night, the total tonnage exceeding that entering the ports of New York and Liverpool in a whole year. The flying delivery of mails to these ships has no parallel elsewhere. Every steamer is met and mail collected and delivered without even slowing up. Orders from headquarters, messages from home, letters written on the trip, the thousand and one communications to and from an enormous fleet are all handled in this great exchange on the water. Letters are stamped on the back, each with the name of the steamer it is intended for, in characters so large that they can be read by lamplight. They are enclosed in water-tight bags, so that if the boat carrying them should be upset, the mail would float uninjured, and are hauled on board the passing vessels, while the return mails are received and an exchange is effected, without deviating from the course or slackening the speed.

Other notable innovations are the placing of mail cars on street railway lines, a service which within a few years has materially expedited local distribution in many localities. The rural delivery, too, has met with much favor, and in a short time will probably reach every home in the land.

The railway postoffice is the artery of the whole system. It was started in 1864. With the development of these, the old system of distributing offices was abandoned. The mails are now handled, sorted, and delivered in the postal car, and all the delay involved in sending to a distributing point is avoided. For this service the most expert training and talent are required. The railway postal clerks must know every postoffice in their whole range of territory as they know the alphabet. With the advance of the railway postal service have come fast mails. The department first required the railway companies to carry the postal cars on their fastest trains. Then each railway postoffice made up mails direct for other railway postoffices with which it connected and to which they were transferred without any intermediary. The next step was to establish exclusive mail trains going faster than any passenger train. These were introduced on the main lines, and have been carried to the highest point of speed and efficiency, the trains often reaching a speed of sixty to seventy miles an hour. An important feature of this service is that, by means of "catcher poucher," mail bags are caught without slowing the trains, so that intermediate points have the advantage of fast mails. This train service is very hazardous, as may be realized from the fact that, within the past ten years, sixty-nine clerks have been killed and 1,324 injured by accidents while they were at their post of duty.

To reduce still further the time of the transit of mails between the sender and the receiver, the department took up the question of anticipating local work and prearranging distribution in the principal cities by transferring city distributers directly to the railway offices, where they separate the mails for carrier routes, and branch offices, thus enabling them to be sent directly to the branch offices or placed in the hands of the carriers immediately upon arrival without the delay of going through the central office. This system has proved very satisfactory in its practical operation, and has materially expedited delivery.

In connection with the transportation of the mails, it is interesting to know how the bags and pouches used in carrying billions of pieces of mail matter deposited in more than 80,000 postoffices and postal cars are distributed and how they find their way back. Practically they are furnished under contract, and nearly all of them, after inspection, are fed into the service through the New York office. The great trend of the mail is from east to west, and from the large commercial centres to the less populous districts. How to recover the mail bags sent to remote sections and have them promptly returned to the large distributing points long since became a serious problem. It was finally solved by designating certain cities, with adequate railroad facilities and ample storage room, as depositories for all surplus mail bags finding their way to offices in the surrounding States. The bags thus accumulated are forwarded to the seat of demand in their own territory, in addition to which two of the depositories—those at Cincinnati and St. Louis—are held in readiness to supply at frequent intervals from 5,000 to 20,000 pieces at a shipment. The repaired equipment flowing from the great repair shop is another large factor in the scheme of distribution, and more than 1,250,000 of the repaired pouches and sacks are fed into the service through the offices in this city, Baltimore, Philadelphia, New York, and Boston.

In addition to the ordinary mail bags so well known to the public, pouches and sacks of special design are used to meet unusual requirements. The mountain carrier, who conveys the mail on foot through the difficult passes, and the runner in the extreme Northwest, who skims over his route on snow shoes, need a peculiar style, and for their purposes a knapsack pouch is provided. The Alaskan carrier, who travels through the snow drifts and the gulches and over the uncut mountain road of an inhospitable and sparsely settled territory, needs still another style, which can be packed singly and not burden or hamper the dog team, which is his means of transportation. Yet another form, unfamiliar except in remote and unsettled sections, is the saddle-bag pouch comfortably carried by the mounted mail rider, strapped to his saddle. The latest application of special equipment is a perforated pouch of new design to be used for mailing live queen bees from the Pacific Coast sometimes as far as the Philippines. Heretofore bees have been carried in ordinary sealed sacks with other mail matter, and they can thus cross the Atlantic in perfect safety. But the voyage across the Pacific is so much longer that the bees are often suffocated, and the new device has been adopted to meet this difficulty. In the mail bag repair shop in this city there is an old woman, stone blind, who has worked upon pouches for over forty years.

Such are a few of the points in the workings of the great postal system of our country. Could one get at the human interest contained and hidden in the mechanical routine of the mammoth machinery, could the contents of one day's mail be revealed, there would be furnished material for countless stories for the novelist and dramatist.

ON GIBRALTAR ROCK.

The Tourist Who Desires to Remain Must Give Bond.

The incoming steamer anchors in the bay half a mile from shore, passengers are taken off in boats, and before entering the city they pass a rigid inspection by the police, who ask a number of pertinent and impertinent questions. The name, nationality, occupation, and mission of the stranger in Gibraltar are entered in a book; he receives a card which entitles him to the hospitality of the rock for twenty-four hours. If he desires to stay longer, a bond of $50 for good behavior will secure him immunity from molestation for not more than thirty to sixty days. This permission, however, can, with the proper kind of influence, be renewed many times.

The town is quaint, picturesque, and quiet, with its 19,000 people, mostly English and Spanish, though the number of different nationalities represented makes it one of the most cosmopolitan places in the world—Jews, Turks, Levantines, the natives of Gibraltar, called "rock scorpions," Africans, and refugees from all nations jostling each other in the three badly built and irritatingly narrow streets of the town. The garrison numbers about 6,000 persons, making the population of the rock about 25,000. The soldiers are, for the most part, regulars brought home from foreign service for rest and recuperation.

The governor of the rock lives in the Government house, formerly an old convent. Everything is done by military rule; the hours of the day are announced by gun fire, the morning gun followed by the bugle reveille wakens the inhabitants from their slumbers, and the bugle blast that follows the evening gun, telling the soldiers to turn in, has become a signal for the civilians to go home and go to bed. The average daily number entering the garrison for the purpose of trading and of bringing in supplies is 30,000, the great proportion of these daily visitors being Spaniards.

The town contains forty-two schools and three good libraries. The dwellings are small, ill-ventilated, badly drained, and not over-clean. They are very crowded, as 15,000 people live in one square mile of low houses. There are no springs of pure water, the great dependence being on rain water, collected in cisterns or on water brought from the mainland and sold by peddlers. Prices are high, almost as high as the Sugar Loaf, the peak of the rock.—Ledger Monthly.

ILLUSTRATED POST CARDS.

A Fad of European Resorts That Is Now Popular.

The Number of the Souvenirs Used Throughout the World During a Season Aggregates Billions—A Happy Idea for the Publishers.

One of the most conspicuous features of the vacation and touring season, now in its prime, is the illustrated post card. Confined at first almost wholly to Europe, there is now hardly a village at which a summer visitor is likely to stop in any part of the United States which has not its representative postal. Convenience no less than beauty commends these little souvenirs, for a correspondence while away from home or traveling often becomes burdensome. Persons have now begun to discover that friends can be satisfied with this pretty remembrance, which informs them of the writer's whereabouts without causing him more than a moment's effort.

The sending of these cards from Europe is particularly in vogue, and it is there that the practice of collecting and preserving them has grown into a perfect mania. The prevalence and rapid rise of the fad is something astounding. Although a hundred years ago a few precursors of the modern card might be found in hotels in Italy, the first of the present order did not appear until 1855 in Basle. This made no impression, however, and illustrated cards were practically unknown until their introduction into Germany in 1870, and then into France in 1872. The adoption of them as souvenirs by the general public only dates from about twelve years ago, but today it is safe to say that there is no country of the world, under civilized influence, that has not its list of illustrated post cards.

It has been estimated by Dr. Hembo, one of the leading authorities on the subject of souvenir postals, that in Germany 88,000,000 cards pass through the postoffice annually, bringing to the Government 6,000,000 marks for postage. This country takes the lead of all others, Austria-Hungary coming next, with 31,000,000 cards mailed. In Italy there are 27,000,000 cards handled by the mails, and in England 14,000,000. Other countries, although falling below these figures, also number them by the millions. The total number put in circulation throughout the world in one year is said by experts to be 2,360,000,000, of which nearly half come from Europe.

The subjects treated are, to quote a French periodical, "everything imaginable and a few other things besides." Pictures of buildings and monuments are most common, and some extremely interesting and quaint cards represent the peasant costumes of their respective localities. Prominent persons are another favorite theme, and a complete picture gallery of the sovereigns of Europe can be gathered in this way. Many designs are purely fanciful, drawn by some artist of repute.

Political cartoon cards are numerous, some amusing ones having appeared illustrative of the Boer war. Each public event of importance also calls out a new card, as in Italy after the death of King Humbert an elaborate card was issued bearing the picture of Queen Margherita and the prayer offered by her at the time.

The series idea was a happy discovery for the publishers, and did much to increase the trade. Among the first cards used in this country was the series produced at the World's Fair in 1892.

Large societies of collectors are now in existence, an international association having its headquarters at Vienna, and publishing a monthly journal in French, English, and German. One of the French journals devoted to the interests of card collectors is under the direction of a young Englishwoman, Miss Belle Ward Campbell, who was born and brought up in Paris. She has also founded an international club of women collectors, which is one of the largest societies of card lovers in France. It is one of the attractions of these card journals that subscribers, by sending a note of their names and mentioning the particular country from which they desire cards, secure opportunities to exchange, through the mail, with persons who, though perfect strangers, are glad to accommodate them. For every card sent, however, the etiquette of the collector requires one in return. Thus collections in a short time may assume gigantic proportions, and many European collectors number their cards by thousands.

Even here in this country there are several large collections, although mostly among foreigners. A Brooklyn woman, who lived abroad for a time, has, probably, one of the largest collections among Americans, her collection numbering over two thousand cards.

Since the cards must have passed through the mail to be prized by the collector, the woman mentioned above has among her cards a valuable set of autographs also, for many of them came from friends in prominent public positions abroad. Thus, a double purpose is sometimes served by this interesting fad.

Another use to which these cards may be put is suggested by a young American woman who, when traveling abroad, illustrated her notebook with them, cutting slits in the pages of the book in which to insert the cards, so that they might be removed at any time. A fascinating little picture journal was the result, and all at the smallest expense. Many of her illustrations, too, could not be found in photographs, and were all the more interesting because unusual.

CROSS-BRED CROPS.

Natural Types of Foodstuffs Improved Artificially in England.

The latest and most daring experiment of modern agriculture was inspected the other day by a party of gentlemen from London, who found it well worth while to spend the whole sultry day in a railway carriage for the sake of one short hour on a farm planted among the Lancashire mills at Newton-le-Willows. It is here that Messrs. Garton (Limited), have the results of twenty years' research in a hitherto undiscovered domain of evolution.

They have done what no one else except, perhaps, Major Hallett, has ever seriously thought of—they have actually bred wheat, oats, barley, and other field plants in order to produce the perfect type, just as the stock farmer breeds animals.

The significance of this is very strange. Nature has denied to cereals the opportunity of cross-fertilization; Messrs. Garton have artificially supplied and fostered it. And the results today are as startling as the theory was twenty years ago, when Mr. John Garton, the youngest of three brothers, started to put it into practice.

A stock of wheat can be produced by cross-fertilization which combines the best characteristics of wheats from all parts of the world. It is in very truth a new breed of wheat, and it is different from and better than any other by reason of increased yield, earlier maturity, and greater strength of straw.

Oats and barley have similarly been bred to produce new and improved types. English barley has three gains to each spike; elaborately cross-fertilized on scientific methods, that every stalk produces a descendant with seventeen grains instead of three only to each spike.

Breeding will do more; it will eliminate the husks of both barley and oats, and so increase their nutritive value that these cereals may eventually supply breakfast foods."

These are new triumphs of evolution and artificial, not natural, selection which are actually accomplished by Messrs. Garton. Their discovery should belong to the nation, for it was freely and unconditionally offered to the Government three times, but finally declined, not because it fails, but because there was no precedent to act upon.

Surely no precedent is necessary for a discovery like this, which could never be more important than it is today. It would double our home-grown cereal food supply without either increased average or cost.

That is proved by experiment to be its certainty; its possibilities seem infinite.—London Express.

THE KING'S TEST OATH.

How the Protestant Succession to the British Throne Is Guarded.

It would probably be no exaggeration to say that the frame of mind of nine out of ten Englishmen on the subject of the sovereign's declaration on transubstantiation and certain cognate subjects might be best represented by Melbourne's classic question, "Why can't you have it alone?" Unfortunately the tenth man is affected by a virulent form of theological rabies, for the cure of which no ecclesiastical Pasteur has yet arisen, and he will not leave the remaining nine in peace.

Earl Grey, in the course of a speech of great moderation and excellent sense in the House of Lords yesterday, expressed the opinions of most rational men when he said that "personally, if he were a Roman Catholic—and there was, probably no member of the House more opposed to their doctrines—he really thought he would prefer the declaration in its old unamended form, because he would regard it as an archaic, meaningless formula which had come down to us."

However, our Roman Catholic fellow-subjects not unreasonably refuse to regard in that light the offensively worded repudiation of beliefs which they hold sacred. Something, therefore, has to be done, and the question is, What shall it be? The very influential and representative committee appointed to consider the problem reported in favor of a form of declaration which, as Earl Grey said, might be conscientiously made by the Empress of China or the Mahdi. Were it adopted the sovereign would assert that certain dogmas are not consistent with the Protestant religion, which no one ever pretended were so. And, so far as the latter part of the declaration is concerned, it might be taken without scruple by the most conscientious Catholic.

It is a sound principle in examining the propriety or necessity of maintaining an ancient form to enquire how it came into existence. Every schoolboy really does know that the declaration in its present form was the Test Act of 30 Charles II, and was incorporated in the Bill of Rights adopted to give statutory effect to the Declaration of Rights which William and Mary accepted as the condition of their elevation to the throne from which James II had been driven. The first section began by reciting the various acts by which James did "endeavor to subvert and extirpate the Protestant religion and the laws and liberties of this kingdom;" the tenth section prescribed that every King or Queen, on the first day of their first parliament, 'shall subscribe and audibly repeat the declaration mentioned in the Statute 30 Charles II."

Now, the statute in question, best known as the Test act, "required all persons holding any office of profit or trust under the Crown to take the oath of allegiance and supremacy, receive the sacraments according to the rites of the Church of England and subscribe the declaration against transubstantiation." This act, though aimed at Roman Catholics, was equally operative against dissenters, and it was not repealed, as is well known, till 1828. The declaration, therefore, was an incident in an episode of great importance, limited, however, to a particular crisis in our history.

We may infer, consequently, that the original justification of that special section of the Bill of Rights was to exclude the possibility of a Roman Catholic successor to the throne. It might, however, have been thought that sufficient precaution against such an occurrence was provided by the ninth section, which we need hardly say is, with the rest of the Bill of Rights, still operative. It runs as follows: "As it has been found by experience inconsistent with the safety and welfare of this Protestant Kingdom to be governed by a Popish prince, or by any king or queen marrying a Papist, it is enacted that all persons who shall hold communion with the Church of Rome, or shall marry a Papist, shall be excluded from the throne, and the crown shall descend to the next heir."

Although public opinion in this country has approved with practical unanimity the abolition of tests, it may be safely averred that there is no appreciable portion of the population which would approve of any interference with the Protestant succession. Therefore the simple issue remains whether it is not possible to safeguard all that the Act of Settlement secured without causing the sovereign to take a declaration the wording of which gives offence to many millions of his subjects. The Lord Chancellor seems to us to have taken too exclusively a lawyer's view of the situation. He demurred to the view that tests were no longer necessary and asserted that "it was not in accordance with the Constitution or the practice of this country."

Lord Grey, however, had contended with admirable justice that "before he was crowned the sovereign was required solemnly to swear that he would govern according to the statutes, maintain the laws of God and truth, and the Protestant religion, as established by law, and he was required to seal his oath with the most sacred form of consecration that the church provided." If that assurance be not considered sufficiently binding, surely all that is requisite is supplied by the Act of Settlement of 1700, which enacts "that whosoever shall hereafter come to the possession of this crown shall join in communion with the Church of England, as by law established."

Fenced in as the throne is with all these safeguards, the declaration would appear to be altogether superfluous, especially when we consider, as Earl Grey pointed out, that no such test is imposed upon any other sovereign in Europe. All reverent persons will agree with Lord Rosebery that nothing could be less suited for Parliamentary debate than "the awful mysteries contained in the declaration." Yesterday's discussion in the House of Lords will have served a very useful purpose if it leads to what seemed the obvious sense of the House, that the declaration should be dropped altogether when the bill, based upon the report of the committee, is brought in.

The archbishops made a grievance of the absence of any member of the Episcopal bench from the committee, but the bishops ought to be thankful that they were spared a very embarrassing function. The question as to whether there should or should not be a declaration is political rather than theological, and an attempt to draw up a suitable form of words might have landed the rulers of the church in a domestic controversy which would certainly have brought, not peace, but a sword, into the establishment.—London Telegraph.

WORLD'S EIGHTH WONDER.

The Tsangpo in Asia Is the Loftiest of All Rivers.

Flows for a Thousand Miles at an Elevation of 11,000 Feet Above the Sea—Drops 8,000 Feet in 150 Miles—Mystery of Its Course.

The Tsangpo is in several respects the most remarkable river in the world. It is the highest of all navigable streams, flowing for nearly a thousand miles at an elevation of from 11,000 feet to 14,000 feet. During the greater part of its course its current is sluggish, but for a hundred miles or more the mighty river, in its descent to the coast plain, runs with the speed of a mountain torrent. Though one of the largest of Central Asian streams, it has never been followed from its source to its mouth, and until recently it was doubtful of which of two well known rivers it was the headwater.

The Tsangpo rises in the extreme southwestern corner of Tibet, at a height of nearly 15,000 feet. Receiving the drainage of the slopes of the Himalayas and of a little known Tibetan range running parallel with these mountains, it soon becomes a stream wide and deep enough to be navigable. There is a considerable boat traffic upon it, at an elevation of little below the summit of Mount Blanc. It flows due east for some 800 miles, receiving numerous large tributaries from both south and north, and when near Lhasa it is, at low water, nearly a third of a mile wide and twenty feet deep; in flood, two miles wide and of unknown depth. In longitude 94 degrees east it makes a sharp bend to the south, and passes through the Himalayas in a course known only to the savages who dwell upon its precipitous banks.

When last seen by an explorer it is at a height of from 8,000 to 11,000 feet, but when it emerges in Assam it is only 400 feet above sea level. From this point it pursues its sluggish way for another 800 miles as the Brahmaputra to the Ganges and the Bay of Bengal. There has been a long controversy, into the details of which it is not necessary to enter, as to whether the Irrawaddy or the Brahmaputra is the continuation of the Tsangpo. Though there has been as yet no direct evidence—the last expedient of throwing in marked logs in Tibet having failed—the general consensus of scientific opinion is in favor of the Brahmaputra, and the latest English gazetteer describes it under this name.

It is hardly to be expected that pure science will be much benefited by the lifting of the veil which hangs over this part of the river's course. But there can be little doubt that it hides scenes of magnificent beauty and grandeur which will thrill the expectant world and give it new and nobler conceptions.

The imagination fails to grasp the reality, as there is no other instance on earth of a large river dropping 8,000 feet in 150 miles, plunging with a mad rush of a mountain brook hemmed by ranges whose peaks are from 13,000 to 22,000 feet in height. The native testimony is conclusive as to the existence of at least one awe inspiring fall before Tibetan territory is left.

Its attempted ascent from the plains of Assam has been absolutely prohibited hitherto by the Indian government on the entirely reasonable ground that there is almost a certainty that the explorer would be killed by the savage Mishmis, who are intolerably jealous of the presence of a stranger in their country. This would necessitate a punitive expedition costly in treasure and in life—an evil by no means commensurate with the gain of having satisfied what is, after all, pure curiosity. The Tibetan officials also, while preventing so far as they are able any white man from Tibet, for some unknown reason forbid Tibetans even to attempt to descend the river beyond their own frontier.

The Tsangpo has been explored, however, with the exception of this 150 miles, notwithstanding the opposition of the Tibetans and the difficulties presented by the highest mountain region in the world, though not by white men.

At any time within the last thirty-five years the trans-Himalayan traveler might have met a caravan of Tibetan and Indian traders with their pack-laden sheep climbing or descending some steep mountain pass, or crossing the Tsangpo on rafts. Walking humbly with the servants or slaves, for to walk is a mark of servitude with those people, there would be an Indian with tea bowl and prayer barrel suspended at his girdle, counting his rosary as he walked, differing in nothing apparently from his companions, except in his more intelligent face and the greater interest with which he noted everything about him. But open his prayer barrel, which he piously twirls when he comes to some particularly dangerous spot, and there will be found in it, instead of the scroll with the Buddhist prayer, "Om mani padmi hom," notes of the journey after the boundary was crossed, observations with sextant and compass and a simple route survey showing the length of each day's march, the relative position of the prominent peaks, the course of the streams and their approximate breadth and depth.

Examine closely his rosary, and one would discover to his surprise that, instead of the orthodox 108 beads, there were only 100, and that he dropped one at every 100 steps, which were uniformly 2½ feet long. If he were watched carefully, he would be seen to steal from camp at night, when all else were sleeping, if biting wind, freezing cold, and driving snow permit, with his box and tea bowl. Taking from beneath the false bottom of his box a few instruments, and pouring some quicksilver into his tea bowl for an artificial horizon, he makes an observation of some star, notes the condition of barometer and thermometer, compares his chronometer with his watch, and then goes back to camp to write up his journal, and at length to sleep.

Years after the traveler might see this same man at the Great Trigonometrical Survey in Calcutta reading to an English officer his journal, explaining his observations and route survey, and narrating his adventures—in one instance these included a seven years' slavery in Tibet. He asks who he is, and is amazed to learn that he is only a schoolmaster in a little Himalayan village in the district of Kumaon.

What is his reward for these years' long toils, sufferings, and dangers, this daily risking his life in an attempt to add to the world's knowledge? A little piece of land, possibly a small pension, and, while he is able to serve—oblivion. But soon the scientific journals will be full of accounts of the wonderful journey of the native Indian explorer, the great extent and marvelous accuracy of his survey, his pluck and endurance, his fertility of resource, and, above all, his single-hearted devotion to the cause of science. If his services are publicly recognized by some great society, with the names of world renowned explorers, we read merely, "The Pundit employed by Capt. T. G. Montgomerie—a gold watch—for his route survey in Great Tibet."

It was in 1861 that the successful opposition of the Tibetans to the exploration of the trans-Himalayan region by Europeans, as well as the fact that Indian traders were permitted to travel freely throughout Tibet, suggested to an officer connected with the Great Trigonometrical Survey of India the expedient of employing native surveyors.

The village schoolmaster, Nain Singh, who had been in the service of the brothers Schlagintweit during their explorations in Kashmir, was the first man to receive the necessary training for the work. At the headquarters of the survey he was taught the use of the sextant, compass, etc., to recognize all the larger stars, to walk with paces of uniform length and to make a simple route survey. When these things had been sufficiently acquired he was sent to explore the Tsangpo from its source to India, if possible. It was 1865 before he succeeded in establishing himself in Tibet as a trader desiring to buy horses and at the same time as a pious Buddhist to do homage to the Lhasa Lama. His "instrumental equipment consisted of a large sextant, two box sextants, prismatic and pocket compass, thermometers for observing temperature of air and of boiling water, pocket chronometer and common watch, with apparatus, the latter reduced as much as possible."

After numerous adventures he finally reached Lhasa, where he had an interview with the Grand Lama, whom he described as a fair and handsome boy of about thirteen years of age, seated on a throne six feet high, attended by two of the highest priests, each holding a bundle of peacock feathers. In this journey he was able to follow the course of the river only to the neighborhood of Lhasa, some 600 miles. Nor did he succeed in tracing it farther in a second journey, made seven years later—a journey memorable, however, from the fact that he made a route survey of 4,519 miles, 1,200 of which were through country never previously explored, and took 497 observations. During all this time he was known to the scientific world only as the "Pundit," but the sufferings of this last journey having so affected his health as to compel him to give up his connection with the survey, his name was disclosed. He has been followed by others, among whom those known as A—k, D—m—g, and K. P., have accomplished the most in trans-Himalayan exploration, all men of like courage, endurance, and animated by a single minded devotion to their duty. But none has succeeded as yet in tracing the Tsangpo's course through the mountains to Assam.

But there are indications of a change of feeling of the rulers of Tibet toward the Indian Government which promises free intercourse between the two countries in the not distant future. As the deadly hostility of the Mishmis to strangers penetrating their mountain fastnesses has been largely due to Tibetan influence, we may look in time to a similar change among them to friendliness. If this should be the case, we trust that the man who lifts the veil which shrouds this wondrous passage of the river through the Himalayas may be one of that noble band, a native Indian surveyor.—National Geographic Magazine.

HUNTING SUBMARINE MINES.

A Thrilling Incident During the Spanish-American War.

A remarkable incident of the recent war with Spain, showing the daring of the American seaman and marine, is graphically told by one of the participants. Its thrilling features are such as to make them welcome additions to the late war history.

A thrilling story, which has never before received newspaper mention, concerns the experiences of some of the crew of the lately wrecked Yosemite, who were detailed to locate and drag for mines of the enemy in Guantanamo Bay. The launch of the steamer that was used for the expedition is the same boat from which five men were drowned during the recent disaster, while trying to get a line ashore at Guam. The launch was in charge of Capt. B. S. Neumann, and with him were Lieutenant Eustis and twelve marines. Among them were Charles B. King, in charge of the engine; Al Steele and William Ryan, firemen; Willard E. Buhl, coxswain; James A. Ballard, Harry M. Leonard, and Ed Ryan, seamen. Mr. King tells the story of the perilous undertaking as follows:

"We left the Yosemite at 11 o'clock at night and started out in the search for mines. It was a clear, beautiful, starlit night, making the chances of detection all the more probable. A Colt's rapid-fire gun was mounted in the bow ready for emergency, and a tarpaulin was spread over the forward cockpit to keep back the reflection of the fires. The firemen worked under cover of the tarpaulin, the coal being gently chucked in by hand to avoid the noise that the use of a shovel would produce. It was trying work for the firemen, who were obliged to use the utmost caution and to labor in very cramped quarters. Under no circumstances were we permitted to travel under more than 100 pounds of steam, for fear of an unexpected exhaust from the safety valve. A navigator's dark lantern was placed on the gauge glass, throwing a small ray of light on the gauge. This in turn was covered by a coat to prevent the light being seen.

"We first went to the Marblehead for grappling irons, and a Cuban guide, who was to point out the location of the mines. After proceeding a short distance we found that the phosphorescents under the bow and the turning of the wheel made a strong white light, and the engine was then slowed down until the launch made only about three miles per hour. We steered in large circles, gradually working up to the narrow part of the bay. Gradually we worked toward the town, until we were directly in front of the fort and in beautiful range of the enemy's guns.

"I had been at the throttle and in charge of the engine the greater part of the night, and being in need of a rest I turned the engine over to an assistant and went into the after cockpit to lie down for a nap. Before doing so I cautioned the assistant not to allow the steam to come over 100 pounds. After sleeping about half hour I got up to find that the steam gauge registered 132 pounds, and as the safety valve usually blew off at 134, it was an extremely trying moment. Prompt action was necessary. The relief pipe to the condenser was opened, ashes were thrown over the fire, and the engine opened up as much as possible to take care of the extra amount of steam. It seemed hours to us in our condition of suppressed excitement before the hand gauge began to show a decreasing pressure. If the safety valve had blown off on so quiet a night far up in the landlocked harbor we would have been soon surrounded and captured. If we had not met a worse fate. We had rockets aboard to notify our ship in case of distress, but as we were four or five miles away it would have been impossible for aid to reach us in time.

"An hour before dawn we started on the return trip, and were all safely on board the Yosemite by daylight, much to the satisfaction of our friends. The late Ensign John Burns exclaimed: 'Thank God, the boys are home again!' Seven mines were afterward brought to the surface near where we dragged, each capable of being fired by contact as well as by electricity from short connections. Each contained 125 pounds of gunpowder. The Marblehead and the Dolphin also had their launches out looking for mines, but they stayed close to the mouth of the harbor and didn't work toward Calmenira."

It may be added, though Mr. King modestly refrained from dwelling upon this phase of the adventure, that the crews of the Marblehead and Dolphin launches received handsome medals and honorable mention from the Government, while the participants in the Yosemite exploit were entirely ignored. Lieutenant Truman H. Newberry brought the matter to the attention of Captain Emory, who considered the incident hardly worthy of mention.—Philadelphia Times.

DRIVING A BIG TUNNEL.

Wonderful Modern Engineering Methods and Apparatus.

Pneumatic Hammers and Oil Forges Used—Traffic Is Not Interrupted. Diving Under a Great Statue—New York's Great Underground Path.

The methods and mechanism used by the contractors who are constructing the rapid transit tunnel in this city are, in the main, identical with those which have been employed for years. And the excellence of the work lies very largely in the care and skill with which old ideas are applied. Nevertheless, there are a few innovations, some of which have been inspired by local emergencies.

Where excavation has been conducted in streets through which railways are running, most of the digging has been done on one side or other of the track. But in that part of Broadway which formerly went by the name of the Boulevard the workmen are taking the soil and rock right out from under the tracks without any interruption of traffic. They behave like "middle-of-the-road" Populists. They won't turn aside for anybody or anything.

The device which the sub-contractor on section 6, William Bradley, employs for this purpose seems simple enough, and yet it has a rather novel application. He uses a number of trusses, which look for all the world like so many short, stout bridges. A foot or so of earth is removed from beneath the track, enough to allow the truss to be slipped under. The latter is then jacked up so as to support the rails and electric conduit. At each of the four corners a special foundation is constructed out of short timbers, crossed as in a log cabin. The truss is now in a position where it will hold its load, and excavation can be conducted to a depth of fifteen, twenty or twenty-five feet, according to the grade, pains being taken not to undermine the foundations of the corners.

By degrees various gas pipes, water pipes and sewers are laid bare. Before enough soil has been removed from below to imperil them vertical iron rods are bolted to them and to the truss. Some of these rods are several feet long. And the ducts which are thus suspended, and some of which must be moved sideways, vary in diameter from six to fifty-four inches.

Mr. Bradley has something like sixty trusses in constant use. Most of them are of timber and present a profile like a very wide, low A, but a few are of steel and are arched. As soon as the excavation is finished at a given point the truss is freed by removing the supports under the corners and it is moved along for fresh service. Eventually, it will be necessary to cut a passageway under the complicated crossing of surface roads at Sixty-fifth Street, and to avoid disturbing the elevated roads there, too. But neither William Bradley, the contractor, nor James Bradley, the foreman, seems at all apprehensive about the task.

The temporary shifting of street railway tracks is not ordinarily a difficult feat. But where the road happens to be operated by the underground trolley system, and the yokes and conduit have the remarkable depth which is peculiar to this city, such a change is quite another matter. Nevertheless, Holbrook, Cabot & Daly did not hesitate to move about 500 feet of track on Fourth Avenue, just above Union Square, to the side of the street, and they did so without interfering with the running of the cars. Thereby the contractors are enabled to work in the middle of the avenue. Most of their digging thus far, however, has been done near one sidewalk or the other. Moreover, they have not been permitted to excavate on both sides at once. However, the privilege is likely to be conceded very soon, and teams will then be compelled to take the centre of the avenue and to stick to the railway tracks.

A particularly interesting, if not difficult, feat was performed three or four weeks ago at the intersection of Broadway, Eighth Avenue and Fifty-ninth Street. In the centre of the "Circle" at that point rises a stone monument which is surmounted by a statue of Columbus. The top of the statue is about 75 or 80 feet above the street level, but is exactly 101 feet above the grade which had been adopted for the bottom of the tunnel. And the route of the tunnel lay under one edge of the foundation of the monument. Naughton & Co. have the contract for this section, and they cut a way through in short order.

Fortunately, it was not necessary to go under the centre of the monument. At that point, therefore, an additional foundation of solid masonry was built. A trench was dug under the monument about eight feet wide and as long as the original concrete foundation—twenty or thirty feet at least—and deep enough to reach to the bottom of the tunnel. When the new masonry had solidified it was safe to remove the earth close to it and to push the tunnel alongside of it. The weight of the monument is estimated at 750 tons, but the new masonry carried it so perfectly that undermining one edge of the original foundation led to no settling or displacement.

In London and other places where there is merely a clay soil to be penetrated it has been found advantageous to use the Greathead shield. This is a metal cylinder, or ring, the front edge of which is sharp, and which is pushed forward horizontally by powerful hydraulic jacks in the rear. But in New York the amount of soft earth to be removed is so small that none of the contractors have found the Greathead system available. The old-fashioned pick and shovel are used instead. For rock drilling compressed air is employed. This same agent operates most of the hoisting machines, the pumps which remove water from the trenches after a rain, and other apparatus. One or two contractors use the old-fashioned portable steam engine to conduct their mechanical operations, but most of them have installed stationary engines and air compressors at convenient points, and get all their power from these stations. Sometimes they find it necessary to transmit the air through 8-inch mains for a distance of 4,000 feet.

The pneumatic hammer is one of the devices which are operated by this compressed air. The invention has been employed to a limited extent in up-to-date boiler ships and shipyards for five years or more, but is still a good deal of a novelty even in the United States. It is more so in Europe. To a rubber hose, which supplies the air, is attached a slender metal cylinder, fifteen inches or more in length. The latter might easily be mistaken for the nozzle of a garden hose. In the end of the tube is a circular mass of steel which slides in and out with great rapidity under the influence of a piston. Grasping the hammer by a handle like that of a hand saw, the workman presses vigorously against the end of the red-hot rivet which he wants to flatten against its plate.

Still more modern is the oil forge which is now used to heat the rivets. Like the coal forge which it displaces, it is small and portable, but it is more economical. It will heat rivets enough to keep four gangs of riveters at work, whereas the coal forge was slower. Compressed air supplies a fine draft for the new force, and breaks the fuel up into spray at the same time—New York Tribune.

A Spender.

(From the Ohio State Journal.)

Gizzam—Who is that young millionaire stopping at the Seaside Hotel?

Gazzam—He's no millionaire; he's only a dry goods clerk on a ten days' vacation.